Name_____ Date_____

5.1 Practice B

In Exercises 1–3, find the indicated real *n*th root(s) of *a*.

1. $n = 3, a = 343$
2. $n = 6, a = -64$
3. $n = 5, a = -243$

In Exercises 4–9, evaluate the expression without using a calculator.

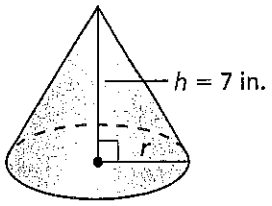
4. $36^{3/2}$
5. $16^{3/4}$
6. $(-32)^{2/5}$
7. $(-125)^{5/3}$
8. $256^{-5/4}$
9. $27^{-4/3}$

In Exercises 10–15, evaluate the expression using a calculator. Round your answer to two decimal places when appropriate.

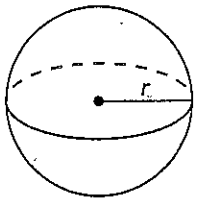
10. $28^{-1/5}$
11. $150^{2/5}$
12. $40{,}351^{6/7}$
13. $750^{-2/5}$
14. $\left(\sqrt[5]{223}\right)^3$
15. $\left(\sqrt[7]{-34}\right)^5$

In Exercises 16 and 17, find the radius of the figure with the given volume.

16. $V = 425 \text{ in.}^3$



17. $V = 1458 \text{ m}^3$



In Exercises 18–23, find the real solution(s) of the equation. Round your answer to two decimal places when appropriate.

18. $6x^4 = 60$
19. $x^5 = -233$
20. $x^4 + 19 = 100$
21. $x^3 + 17 = 57$
22. $\frac{1}{5}x^4 = 125$
23. $\frac{1}{7}x^3 = -49$

24. Kepler's third law states that the relationship between the mean distance d (in astronomical units) of a planet from the Sun and the time t (in years) it takes the planet to orbit the Sun can be given by $d^3 = t^2$.

    a. It takes Venus 0.616 year to orbit the Sun. Find the mean distance of Venus from the Sun (in astronomical units).

    b. The mean distance of Jupiter from the Sun is 5.24 astronomical units. How many years does it take Jupiter to orbit the Sun?

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5.2 Practice B

In Exercises 1–6, use the properties of rational exponents to simplify the expression.

1. $\dfrac{2^{2/5}}{2}$

2. $\left(\dfrac{3^6}{12^6}\right)^{-1/6}$

3. $\left(11^{3/2} \cdot 11^{-5/2}\right)^{-1/3}$

4. $\left(9^{-3/5} \cdot 9^{1/5}\right)^{-1}$

5. $\dfrac{3^{3/4} \cdot 27^{3/4}}{9^{3/4}}$

6. $\dfrac{25^{5/9} \cdot 25^{7/9}}{5^{4/3}}$

In Exercises 7–12, use the properties of radicals to simplify the expression.

7. $\sqrt[3]{25} \cdot \sqrt[3]{625}$

8. $\sqrt[5]{6} \cdot \sqrt[5]{81}$

9. $\dfrac{\sqrt[4]{176}}{\sqrt[4]{11}}$

10. $\dfrac{\sqrt{7}}{\sqrt{700}}$

11. $\dfrac{\sqrt[3]{5} \cdot \sqrt[3]{50}}{\sqrt[3]{2}}$

12. $\dfrac{\sqrt[4]{4} \cdot \sqrt[4]{12}}{\sqrt[8]{3} \cdot \sqrt[8]{3}}$

In Exercises 13–18, write the expression in simplest form.

13. $\dfrac{\sqrt[3]{4}}{\sqrt[3]{9}}$

14. $\sqrt[3]{\dfrac{4}{25}}$

15. $\sqrt[4]{\dfrac{2401}{4}}$

16. $\dfrac{7}{5 - \sqrt{3}}$

17. $\dfrac{6}{\sqrt{2} + \sqrt{7}}$

18. $\dfrac{\sqrt{2}}{\sqrt{15} - \sqrt{3}}$

In Exercises 19–24, simplify the expression.

19. $10\left(25^{2/3}\right) - 6\left(25^{2/3}\right)$

20. $2\sqrt{54} - 11\sqrt{6}$

21. $13\sqrt[3]{3} - \sqrt[3]{375}$

22. $\sqrt[5]{486} + 10\sqrt[5]{2}$

23. $4\left(48^{1/4}\right) - 3\left(3^{1/4}\right)$

24. $\left(7^{1/3}\right) + 4\left(189^{1/3}\right)$

25. The volume of a right circular cylinder is $V = 9\pi r^2$, where r is the radius.

   a. Use radicals to solve $V = 9\pi r^2$ for r. Simplify, if possible.

   b. Substitute the expression for r from part (a) into the formula for the surface area of a right cylinder, $S = 18\pi r + \pi r^2$.

   c. Use the answer to part (b) to find the surface area of a right cylinder when the volume is 108 cubic meters.